D1

PATENT SPECIFICATION

554,695

Application Date : Jan. 13, 1942. No. 478/42.

Complete Specification Accepted : July 15, 1943.

COMPLETE SPECIFICATION

Improvements in Joints and Bearings comprising Resilient Elements applicable to Wheels Suspension and other purposes

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1, Albany Street, in the County of London, and JAMES CLAUDE HICKMAN, a British Subject of the aforesaid Company's Works at Fort Dunlop, Erdington, Birmingham, in the County of Warwick, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention concerns improvements in elastic joints and bearings and particularly concerns elastic joints of the kind in which a resilient element such as a rubber sleeve is interposed between a pair of members subjected to relative angular displacement including relative oscillatory movement.

To avoid frictional abrasion and to secure a more positive connection between the sleeve or element and such members the rubber surface of the sleeve may be bonded to the members the relative displacement of which is then accommodated by the internal deformation of the rubber element.

Such relative movement when of an oscillatory nature or other small amplitude may be readily absorbed by a sleeve or bush which is comparatively thin so that the general rigidity of the joint in other directions is not impaired.

The accommodation of any greater or additional angular movement however, can only be sustained by a thicker bush, the use of which may reduce the general rigidity of the joint below the standard required in certain fields of application unless the necessity for a thicker bush can be obviated.

In vehicle wheel suspensions for example wherein the wheel carrying arm is pivoted to the joints of the vehicle the arm moves through a working angle in relation to the chassis which may be much smaller than the angle through which the arm is moved from its attachment position on assembly with the vehicle to its working position when supported by the ground.

The object of the present invention is to remove the strain due to such initial movement and to confine the torsional stresses on the rubber element to those arising solely from the normal operating conditions, thus enabling a bush to be employed of a minimum thickness sufficient to withstand repeated deformation due to oscillation, while maintaining the rigidity of the connection to the maximum degree.

According to this invention a yielding joint or pivot comprises a resilient element secured on opposite sides to the adjacent faces of two members which are subjected to an initial relative angular displacement to a working position in which the element is subjected to relative oscillatory movement between the members, wherein a support is interposed between the element and one member and is securable to the latter, after said initial angular displacement, in a position such that the element is free from predistortion.

The element may consist of a rubber bush bonded on one of its surfaces to a support in the form of a sleeve positioned between tubular members and provided with a flange securable to one of said members in variable relation thereto.

One of the members may be provided with a wheel carrying arm extending at an angle to its axis and the other members may be formed upon or secured to a part of the chassis or body of a vehicle.

In order that the invention may be more easily understood and readily carried into effect, the same will now be described with reference to the accompanying drawings in which:—

Fig. 1 is a part sectional view of the joint on the line A—A of Fig. 2.

Fig. 2 is a plan view of the joint shown in Fig. 1.

Referring to the drawings the joint comprises a resilient element in the form of a rubber bush 1 which is interposed between an outer member 2 which may constitute an integral part of the chassis and an inner member 3 displaceable in angular relation to the outer member 2 as by an arm or crank 4 constituting the

[Price 1/- 4s 6d

wheel carrying arm of an independent vehicle wheel suspension.

The inner surface of the rubber bush 1 may be bonded directly to the shaft 3 but to facilitate assembly is preferably bonded directly to the surface of a metal sleeve 11 the inner surface of which is formed with grooves 5 engaging with splines 6 formed on the surface of the shaft 3.

The outer surface of the rubber bush 1 is bonded to the inner surface of the sleeve 7 which is concentric with the shaft 3 and is rotatable in angular relation to the outer or chasis member 2 through apertures formed therein or through a bracket secured thereto.

The metal sleeve 7 is formed with a flange 8 which may abut the member 2 as shown and is securable thereto in variable angular relation by any convenient means as for example by nuts and bolts 9 the stems of which pass through arcuate slots 10 in the flange 8 and through apertures in the member 2.

The above described joint enables the wheel supporting arm 4 of the vehicle wheel suspension to be articulated to the chassis in a convenient initial position in which the arm is substantially vertical. The vehicle body may then be lowered towards the ground until it is supported by its normal upringing system with the arm at its desired working inclination to the chassis, the lowering movement causing a corresponding angular movement of the flange 8 in relation to the chassis 2 due to the angular movement of the shaft 3 to which the bush 1 is keyed.

While the body of the vehicle and chassis member 2 are maintained in this position the bolts and nuts 9 are tightened up on the slots 10 so that the resilient bush element 1 is held in its working position without any predistortion due to torsional stress consequent upon the initial angular movement between the shaft 3 and chassis member 2. The resilient joint is then only subjected to limited deformation by the oscillaion of the wheel-carrying arm above and below its mean position.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:

1. A yielding joint or pivot comprising a resilient element secured on opposite sides to two members subjected to an initial relative angular displacement to a working position in which the element is subjected to relative oscillatory movement between the members, wherein a support is interposed between the element and one member and is securable to the latter, after said initial angular displacement, in a position such that the element is free from predistortion.

2. A joint or pivot according to claim 1 wherein said element consists of a rubber bush bonded on one of its surfaces to a support in the form of a sleeve which is positioned between members of tubular form and is provided with a flange secured to one of said members in variable angular relation thereto.

3. A joint or pivot according to claim 2 forming part of a vehicle wheel suspension wherein one of said members is provided with a wheel carrying arm extending at an angle to its axis and the other member is secured to the chassis of the vehicle.

4. A joint or pivot according to claim 2 wherein said flange is formed with arcuate slots for the passage of securing nuts and bolts the stems of which pass through apertures in one of said members.

5. Yielding joints and pivots substantially as described with reference to the accompanying drawings.

6. Vehicle wheel suspensions when provided with the joints and pivots claimed in any of the preceding claims.

Dated the 9th day of January, 1942.

W. BOND,
Acting for the Applicants.

Leamington Spa. Printed for His Majesty's Stationery Office, by the Courier Press.—1943.

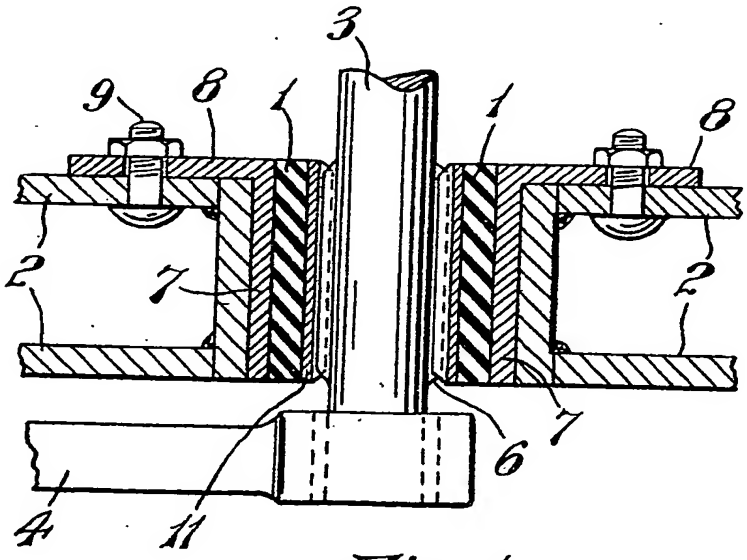

Fig. 1.

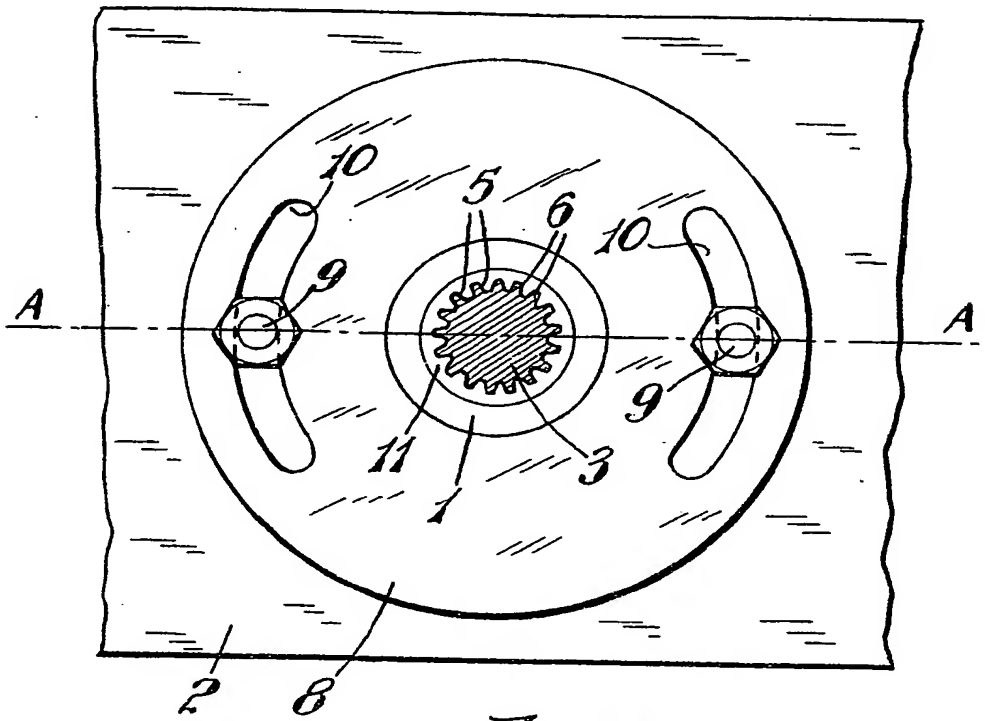

Fig. 2.

Malby & Sons, Photo-Lith.